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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/829,365

04/09/2001

Scott B. Kesler

9693

7590

03/05/2003

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EXAMINER

HARRISON, MONICA D

ART UNIT

PAPER NUMBER

2829

DATE MAILED: 03/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/829,365

Applicant(s)

KESLER, SCOTT B.

Examiner

Monica D. Harrison

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

The amendment filed on 11/18/02 has been entered in the case.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1-8 and 11-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Butler Jr. (6,263,727 B1).

1. Regarding claim 1, Butler Jr. discloses an ignition diagnostic system for an internal combustion engine, comprising: an ignition coil (Figure 1A, reference 14) having a primary coil (Figure 1, reference 16) coupled to a secondary coil (Figure 1, reference 18), said secondary coil connected across an electrode gap (Figure 1, references 24 and 26) of an ignition plug (Figure 1, reference 22); means for producing a bias voltage across said electrode gap during a period of time following generation of a spark across said gap(column 3, lines 57-67; column 4, lines 1-8); a detection circuit producing a buffered version of any ion current flowing across said electrode gap resulting from said bias voltage(Figure 1A, reference 28; column 4, lines 9-32); and a diagnostic circuit responsive to said buffered version of said ion current to produce an output signal, said output signal defining a pulse width indicative of combustion quality that is proportional to an amount of said ion current flowing across said electrode gap (Figure 1A, reference 32; column 4, lines 34-58).

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2. Regarding claim 2, Butler Jr. discloses diagnostic circuit is configured to produce said output signal with a pulse width indicative of complete combustion if said ion current flowing across said electrode gap is greater than a first predefined amount of current (column 3, lines 62-67; column 4, lines 1-3).

3. Regarding claim 3, Butler Jr. discloses diagnostic circuit is configured to produce said output signal with a pulse width indicative of non-combustion event if said ion current flowing across said electrode gap is greater than a second predefined amount of current (column 3, lines 62-67; column 4, lines 1-3).

4. Regarding claim 4, Butler Jr. discloses including a capacitor electrically connected to said diagnostic circuit, said diagnostic circuit charging said capacitor proportional to an amount of ion current flowing across said electrode gap, said pulse width of said output signal defined by a discharge time of said capacitor to a predefined voltage level (Figure 3B; column 6, lines 42-65).

5. Regarding claim 5, Butler Jr. discloses including an ignition control circuit configured to control a coil switching device electrically connected to said primary coil, said ignition control circuit configured to control said coil switching device to energize said primary coil a plurality of times during any ignition plug firing event (column 3, lines 27-67; column 4, lines 1-58).

6. Regarding claim 6, Butler Jr. discloses means for producing a bias voltage includes said coil switching device, said primary coil and said secondary coil, said bias voltage resulting from a rapid increase in a voltage across said primary coil each of said plurality of

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times said coil switching device energizes said primary coil (column 3, lines 27-67; column 4, lines 1-58).

7. Regarding claim 7, Butler Jr. discloses diagnostic circuit is configured to produce said output signal with a pulse width indicative of complete combustion if said ion current flowing across said electrode gap is greater than a first predefined amount of current; said diagnostic circuit further configured to produce a termination signal indicative of and end of said ignition plug firing event if said ion current flowing across said electrode gap is greater than said first predefined amount of current (column 4, lines 52-67; column 5, lines 1-57).

8. Regarding claim 8, Butler Jr. discloses including an ignition control circuit configured to control a coil switching device electrically connected to said primary coil, said ignition control circuit configured to control said coil switching device to energize said primary coil only a single time during any ignition plug firing event (Figure 3A; column 6, lines 23-41).

9. Regarding claim 11, Butler Jr. discloses an ignition diagnostic system for an internal combustion engine, comprising: an ignition coil (Figure 1A, reference 14) having a primary coil (Figure 1A, reference 16) coupled to a secondary coil (Figure 1A, reference 18), said secondary coil connected across an electrode gap (Figure 1A, references 24 and 26) of an ignition plug (Figure 1A, reference 22); means for producing a bias voltage across said electrode gap during a period of time following generation of a spark across said gap (column 3, lines 57-67; column 4, lines 1-8); a detection circuit producing a buffered version of any ion current flowing across said electrode gap resulting from said bias voltage (Figure 1A, reference 28; column 4, lines 9-32); a diagnostic circuit responsive to at least some amount of said buffered

version of said ion current to produce an output signal defining a pulse width indicative of a fouled plug condition (column 3, lines 57-67; column 4, lines 1-3).

10. Regarding claim 12, Butler Jr. discloses including a capacitor electrically connected to said diagnostic circuit, said diagnostic circuit charging said capacitor proportional to an amount of ion current flowing across said electrode gap, said pulse width of said output signal defined by a discharge time of said capacitor to a predefined voltage level (Figure 3B; column 6, lines 42-53).

11. Regarding claim 13, Butler Jr. discloses including an ignition control circuit configured to control a coil switching device electrically connected to said primary coil, said ignition control circuit configured to control said coil switching device to energize said primary coil a plurality of times during any ignition plug firing event (column 3, lines 27-67; column 4, lines 1-58).

12. Regarding claim 14, Butler Jr. discloses means for producing a bias voltage includes said coil switching device, said primary coil and said secondary coil, said bias voltage resulting from a rapid increase in a voltage across said primary coil each of said plurality of times said coil switching device energizes said primary coil (column 3, lines 27-67; column 4, lines 1-58).

13. Regarding claim 15, Butler Jr. discloses including an ignition control circuit configured to control a coil switching device electrically connected to said primary coil, said ignition control circuit configured to control said coil switching device to energize said primary coil only a single time during any ignition plug firing event (Figure 3A; column 6, lines 23-41).

14. Regarding claim 16, Butler Jr. discloses an ignition diagnostic system for an internal combustion engine, comprising: an ignition coil (Figure 1A, reference 14) having a primary coil (Figure 1A, reference 16) coupled to a secondary coil (Figure 1A, reference 18), said secondary coil connected across an electrode gap (Figure 1A, references 24 and 26) of an ignition plug (Figure 1A, reference 22); means for producing a bias voltage across said electrode gap during a period of time following generation of a spark across said gap(column 3, lines 57-67; column 4, lines 1-8); a detection circuit producing a buffered version of any ion current flowing across said electrode gap resulting from said bias voltage(Figure 1A, reference 28; column 4, lines 9-32); a diagnostic circuit producing an output signal defining a pulse width indicative of a non-combustion event if said detection circuit fails to detect ion current flowing across said electrode gap resulting from said bias voltage (column 3, lines 57-67; column 4, lines 1-3).

15. Regarding claim 17, Butler Jr. discloses including a capacitor electrically connected to said diagnostic circuit, said diagnostic circuit initially charging said capacitor to a pre-charge level and thereafter charging said capacitor proportional to an amount of ion current flowing across said electrode gap, said pulse width of said output signal defined by a discharge time of said capacitor to a predefined voltage level (column 4, lines 22-57).

16. Regarding claim 18, Butler Jr. discloses including an ignition control circuit configured to control a coil switching device electrically connected to said primary coil, said ignition control circuit configured to control said coil switching device to energize said primary coil a plurality of times during any ignition plug firing event (column 3, lines 27-67; column 4, lines 1-58).

17. Regarding claim 19, Butler Jr. discloses means for producing a bias voltage includes said coil switching device, said primary coil and said secondary coil, said bias voltage resulting from a rapid increase in a voltage across said primary coil each of said plurality of times said coil switching device energizes said primary coil (column 3, lines 27-67; column 4, lines 1-58).

18. Regarding claim 20, Butler Jr. discloses including an ignition control circuit configured to control a coil switching device electrically connected to said primary coil, said ignition control circuit configured to control said coil switching device to energize said primary coil only a single time during any ignition plug firing event (column 3, lines 27-67; column 4, lines 1-58).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Butler Jr. (6,263,727 B1) in view of Rask (6,032,650).

19. Butler Jr. claims all subject matter except including a control circuit responsive to said output signal to determine a quality of combustion of an air/fuel mixture within an engine cylinder in communication with said ignition plug (claim 9) and discloses control circuit is responsive to a number of output signals each corresponding to a different one of a



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corresponding number of engine cylinders to determine a quality of combustion of an air/fuel mixture within any of said number of engine cylinders (claim 10).

20. Regarding claim 9, Rask discloses including a control circuit responsive to said output signal to determine a quality of combustion of an air/fuel mixture within an engine cylinder in communication with said ignition plug (column 5, lines 7-67; column 6, lines 14-50).

21. Regarding claim 10, Rask discloses control circuit is responsive to a number of output signals each corresponding to a different one of a corresponding number of engine cylinders to determine a quality of combustion of an air/fuel mixture within any of said number of engine cylinders (column 5, lines 7-67; column 6, lines 14-50).

Since Butler Jr. and Rask are both from the same field of endeavor, the purpose disclosed by Rask would have been recognized as pertinent art of Butler Jr.

It would have been obvious at the time the invention was made to one with ordinary skill in the art to modify Butler Jr. with the teachings of Rask for the purpose of providing a reliable ignition of the air-fuel mixture in the cylinder is obtained and where the likelihood for misfires and of exhaust of unburned fuel is minimized.

### ***Response to Arguments***

22. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection. Butler Jr. discloses diagnostic circuitry that processes the ion current information for the purpose of combustion condition or misfire.

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***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica D. Harrison whose telephone number is 703-305-4758.


The examiner can normally be reached on M-F 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kammie Cuneo can be reached on 703-308-1233. The fax phone numbers for the organization where this application or proceeding is assigned are 703-306-7382 for regular communications and 703-305-3839 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1782.

Monica D. Harrison  
AU 2855

mdh  
February 26, 2003

  
**KAMAND CUNEO**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2800**